

USSN 10/782,397
Amendment and Response to
Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

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Claims 1, 4, and 8-10 have been amended. Support for the amendments can be found throughout the specification as originally filed, e.g., at page 29, lines 7-9 (Example 3). No new matter has been added.

Claims 1-10, 28-30, 50, 55-58, 60, 62, 64-67, and 69 are pending in the instant application; claims 28-30, 50, 55-57, 62, 64 and 65 have been withdrawn from consideration. Therefore, claims 1-10, 58, 60, 66-67 and 69 are presently under examination.

The amendments to and cancellations of certain claims are being made for the purpose of expediting prosecution and are made without prejudice or waiver. Applicants reserve the right to present the original or previously-pending claims in this or a continuing application.

Rejection of claims under 35 USC §112, second paragraph

In the Office Action, claim 9 was rejected as being indefinite due to a typographical error. This error has been corrected by the claim amendments herein, as shown above. Applicants submit that claim 9 is fully compliant with the requirements of 35 USC 112, first paragraph

Rejection of claims under 35 USC §102(b) and/or §103(a)

Claims 1-10, 58, 60, 66-67 and 69 stand rejected under 35 USC §102(b) as anticipated by, or, in the alternative, obvious under 35 USC §103(a) over Takahashi, EP1159995 ("Takahashi"). The Examiner stated that "[t]he claims are considered to read on Takahashi . . . [I]f a difference exists between the [present] claims and Takahashi . . . it would reside in optimizing the elements of Takahashi." Office Action at page 2. These statements are traversed.

USSN 10/782,397
Amendment and Response to
Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

As Applicants understand the reference, Takahashi discloses certain materials having a hydrophobic moiety and an ion exchange moiety (see, e.g., paragraph [0001] of Takahashi). Ion exchange groups according to Takahashi include anion exchangers such as quaternary ammonium groups, primary amino groups, secondary amino groups, tertiary amino groups, and a mixture of primary and secondary amino groups (see, e.g., Takahashi at paragraph [0033]). However, the only amine exemplified in Takashi is a quaternized triethylamine (see, e.g., paragraph [0054] of Takahashi). Takahashi does not teach or suggest a porous material comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety selected from the group consisting of a cyclic tertiary amine and a substituted cyclic amine, as required by present claim 1, as amended. Thus, Takahashi does not anticipate, nor render obvious, the pending claims

Claim 4 stands rejected under 35 USC §103(a) as being unpatentable over Takahashi, EP1159995 ("Takahashi"), and further in view of Hofstee, U.S. Patent No. 4,000,098 ("Hofstee") and Unger, Chromatographic Science Series 47:585-720 (1990) ("Unger"). The Examiner stated that "[i]t would have been obvious to use benzylamine in Takahashi because Hofstee discloses that benzylamine is interchangeable with secondary amines and because Unger discloses that aromatic amines are anion exchangers." Office Action at page 3 (citations omitted). These statements are traversed.

As discussed above, Takahashi does not teach or suggest the use of a cyclic amine, as required by present claim 1, as amended, from which claim 4 depends. As Applicants understand the reference, Hofstee discloses matrices useful for hydrophobic interaction chromatography. While the Examiner points to Col. 3, lines 38-64 of Hofstee, Applicants note that this section contains no teaching of the use of cyclic amines in a chromatographic matrix (note that benzylamine, cited by the Examiner, is not a cyclic amine). Thus, the Hofstee reference, whether taken alone or combined with one or more of the remaining cited references, does not teach or suggest the claimed invention.

As Applicants understand the reference, the Unger reference is a review. Although the Examiner has cited Unger as teaching that "aromatic amines are anion

USSN 10/782,397
Amendment and Response to
Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

exchangers." Applicants note that the Examiner has not cited Unger for any teaching of the use of cyclic amines as claimed in present claim 1 (as amended).

None of Takahashi, Hofstee and Unger, alone or in combination, teach or suggest a porous material comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety selected from the group consisting of a cyclic tertiary amine and a substituted cyclic amine, as required by claim 1 (from which claim 4 indirectly depends). Applicants further contend that the pending claims, including claim 4, are not rendered unpatentable by Takahashi, Hofstee and Unger, alone or in combination.

Claims 8-10 stand rejected under 35 USC §103(a) as being unpatentable over Takahashi, and further in view of Unger. The Examiner stated that "[i]t would have been obvious to react with a haloalkyl in Takahashi because Unger discloses that benzylamine is interchangeable with secondary amines and because Unger discloses chloromethylating a polymer and reaction with ammonia, a primary amine, or a secondary amine is one way of forming an anion exchanger." Office Action at page 3 (citations omitted). These statements are traversed.

The teachings of Takahashi and Unger are discussed above. Neither Takahashi nor Unger discloses a porous particle comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety, and wherein the hydrophobic monomer is substituted by at least one haloalkyl group, and the ion-exchange functional is formed by reaction of the haloalkyl group with a cyclic amine, as required by pending claim 8 (as amended), and claims 9-10 which depend therefrom. Applicants therefore urge that claims 8-10 are not obvious over Takahashi or Unger, whether taken alone or in combination.

Claims 1-10, 58, 60, 66, 67 and 69 stand rejected under 35 USC §103(a) as being unpatentable over each of Lee, U.S. Patent No. 6,322,695 ("the '695 patent"), Lee (WO99/64480), and Takahashi, in view of either Fritz (U.S. Patent No. 5,618,438; hereinafter "Fritz") or Takahashi. The Examiner stated that "[i]t would have been obvious to use secondary amines in each of Lee [the '695 patent] or Lee (WO 99/64480), and Takahashi either because Fritz discloses that secondary amines are an

USSN 10/782,397
Amendment and Response to
Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

alternative to sulfonates as a functionalizing agent for divinylbenzene particles used for solid phase extraction or because Takahashi discloses that secondary amines are an alternative to hydrophobic/hydrophilic copolymers for solid phase extraction." Office Action at page 4 (some citations omitted). These statements are traversed.

The teachings of Takahashi are discussed above. It is noted that the two Lee references appear to be identical in disclosure, and they will therefore be addressed together (hereinafter "the Lee references") unless otherwise noted¹. The Lee references disclose copolymers functionalized with an ion-exchange functional group which can include certain amines; however, the structures of the "ion-exchange functional group" of the Lee references do not include non-quaternized (including tertiary) cyclic amines. Although the Lee references mention that the hydrophilic monomer backbone can comprise a heterocyclic group, including a nitrogen-containing heterocyclic group (see, e.g., the '695 patent at Col. 3, line 64 – Col. 4, line 3), the Lee references do not teach or suggest that the "ion-exchange functional group" includes a cyclic tertiary amine or a substituted cyclic amine, as required by the pending claims.

As the reference is understood, Fritz discloses poly(styrene divinylbenzene) particles functionalized with amines, including secondary amines, but none of the disclosed amines are cyclic amines (see, e.g., Col. 5, line 61 – Col. 6, line 3).

Applicants therefore contend that none of the cited references, alone or in combination, teaches or suggests a porous material comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety selected from the group consisting of a cyclic tertiary amine and a substituted cyclic amine, as required by present claim 1, as amended (and claims dependent therefrom). Therefore, even if one of ordinary skill in the art were motivated to make the combination proposed by the Examiner (which Applicants do not concede), the modification would not result in the claimed invention. Applicants therefore urge that claims 1-10, 58, 60, 66, 67 and 69 are not obvious over the cited references, whether taken alone or in combination.

¹ Applicants note that the present application claims priority to the application that matured into the '695 patent, and that the '695 is co-owned with the present application. Accordingly, Applicants do not concede that either of the Lee references is prior art.

USSN 10/782,397
Amendment and Response to
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Attorney Docket No. 60505CIP2 (49991)

Claim 4 stands rejected under 35 USC §103(a) as being unpatentable over each of Lee, U.S. Patent No. 6,322,695 ("the '695 patent"), Lee (WO/99/64480), and Takahashi, in view of either Fritz or Takahashi and further in view of Hofstee and Unger. The Examiner stated that "[i]t would have been obvious to use benzylamine in each of [the Lee references] and Takahashi in view of either Fritz or Takahashi because Hofstee discloses that benzylamine is interchangeable with secondary amines and Unger discloses that aromatic amines are anion exchangers." Office Action at page 5 (citations omitted). These statements are traversed.

The teachings of each of these references has been discussed above. Although the Examiner points to Col. 3, lines 38-64 of Hofstee, Applicants note that this section contains no teaching of the use of cyclic amines in a chromatographic matrix (note that benzylamine, cited by the Examiner, is not a cyclic amine). Although the Examiner has cited Unger as teaching that "aromatic amines are anion exchangers," Applicants note that the Examiner has not cited Unger for any teaching of the use of cyclic amines as claimed in present claim 1 (as amended), from which claim 4 depends.

None of the cited references, alone or in combination, teach or suggest a porous material comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety selected from the group consisting of a cyclic tertiary amine and a substituted cyclic amine, as required by claim 1 (from which claim 4 indirectly depends). Therefore, even if one of ordinary skill in the art were motivated to make the combination proposed by the Examiner (which Applicants do not concede), the modification would not result in the claimed invention.

Applicants therefore submit that claim 4 is not obvious over the cited references, whether taken alone or in combination.

Claims 8-10 stand rejected under 35 USC §103(a) as being unpatentable over the Lee references and Takahashi in view of either Fritz or Takahashi and further in view of Unger. The Examiner stated that "[i]t would have been obvious to react with a haloalkyl in each of [the Lee references] and Takahashi in view of either Fritz or Takahashi because Unger discloses chloromethylating a polymer and reaction with ammonia, a primary amine, or a secondary amine is one way of forming an anion

USSN 10/782,397
Amendment and Response to
Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

exchanger." Office Action at pages 5-6 (citations omitted). These statements are traversed.

The teachings of each of these references has been discussed above. None of the cited references discloses a porous particle comprising a copolymer of at least one hydrophobic monomer and at least one hydrophilic monomer, wherein the copolymer further comprises at least one ion-exchange functional moiety, and wherein the hydrophobic monomer is substituted by at least one haloalkyl group, and the ion-exchange functional is formed by reaction of the haloalkyl group with a cyclic amine, as required by pending claim 8 (as amended), and claims 9-10 which depend therefrom. Therefore, even if one of ordinary skill in the art were motivated to make the combination proposed by the Examiner (which Applicants do not concede), the modification would not result in the claimed invention.

Applicants therefore submit that claims 8-10 are not obvious over the cited references, whether taken alone or in combination.

Reconsideration and withdrawal of the rejections under 35 USC §102(b) and/or §103(a) is proper and such action is respectfully requested.

CONCLUSION

For at least the foregoing reasons, reconsideration and withdrawal of all rejections is proper. Applicants submit that this application is in condition for allowance, and such action is requested.

If a telephone conversation with Applicants' attorney would help expedite the prosecution of the above-identified application, the Examiner is urged to call either of the undersigned representatives at (617) 439-4444.

The Director is hereby authorized to charge all required fees and any deficiency in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 04-1105, under Order No. 60505CIP2(49991). A duplicate copy of this paper is enclosed.

USSN 10/782,397
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Office Action dated April 24, 2006

Attorney Docket No. 60505CIP2 (49991)

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Respectfully submitted,

By Mark D. Russett

Mark D. Russett
Registration No.: 41,281
EDWARDS ANGELL PALMER & DODGE LLP
P.O. Box 55874
Boston, Massachusetts 02205
(617) 439-4444
Attorneys/Agents For Applicants

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